

THE ANNALS
of
MATHEMATICAL
STATISTICS

FOUNDED AND EDITED BY H. C. CARVER, 1930-1938

EDITED BY S. S. WILKS, 1938-1949

THE OFFICIAL JOURNAL OF THE INSTITUTE OF
MATHEMATICAL STATISTICS

VOLUME 40

1969



CONTENTS OF VOLUME 40

ARTICLES AND NOTES

ABE, O. A central limit theorem for the number of edges in the random intersection of two graphs.....	144-151
ABRAHAMSE, ALLAN F. The tail field of a Markov chain.....	127-136
AFIFI, A. A. AND ELASHOFF, R. M. Multivariate two sample tests with dichotomous and continuous variables I. The location model.....	290-298
AL-ANI, S., JOURIS, G. M. AND PILLAI, K. C. S. On the distributions of the ratios of the roots of a covariance matrix and Wilks' criterion for tests of three hypotheses.....	2033-2040
ANDERSON, WILLIAM N., JR., KLEINDORFER, GEORGE B., KLEINDORFER, PAUL R. AND WOODROOFE, MICHAEL B. Consistent estimates of the parameters of a linear system.....	2064-2075
ARVESEN, JAMES N. Jackknifing U-statistics.....	2076-2100
ATHREYA, KRISHNA, B. On the supercritical one dimensional age dependent branching processes.....	743-763
ATWOOD, CORWIN L. Optimal and efficient designs of experiments..	1570-1602
BARLOW, RICHARD E. AND GUPTA, SHANTI S. Selection procedures for restricted families of probability distributions.....	905-917
BARLOW, R. E., GUPTA, S. S., AND PANCHAPAKESAN, S. On the distribution of the maximum and minimum of ratios of order statistics.....	918-934
BARLOW, R. E. AND PROCHAN, F. A note on tests for monotone failure rate based on incomplete data.....	595-600
BARTHOLOMEW, D. J. Sufficient conditions for a mixture of exponentials to be a probability density function.....	2183-2188
BASU, D. AND GHOSH, J. K. Invariant sets for translation-parameter families of measures.....	162-174
BELL, C. B. AND HALLER, SMITH H. Bivariate symmetry tests: parametric and nonparametric.....	259-269
BERAN, R. J. Asymptotic theory of a class of tests for uniformity of a circular distribution.....	1196-1206
BERK, ROBERT H. Biorthogonal and dual configurations and the reciprocal normal distribution.....	393-398
BERK, ROBERT H. Strong consistency of certain sequential estimators.....	1492-1495
BICKEL, P. J. A distribution free version of the Smirnov two sample test in the p -variate case.....	1-23
BICKEL, P. J. A remark on the Kolmogoroff-Petrovskii criterion....	1086-1090
BICKEL, P. J. Tests for monotone failure rate II.....	1250-1260
BICKEL, PETER J. AND DOKSUM, KJELL A. Tests for monotone failure rate based on normalized spacings.....	1216-1235

BICKEL, P. J. AND LEHMANN, E. L. Unbiased estimation in convex families.	1523-1535
BICKEL, PETER J. AND YAHAV, JOSEPH A. On an A.P.O. rule in sequential estimation with quadratic loss.	417-426
BINMORE, K. G. AND STRATTON, H. H. A note on characteristic functions.	303-307
BLUM, J. R. AND ROSENBLATT, JUDAH. On fixed precision estimation in time series.	1021-1032
BOES, ARDEL J. Conditional probability on Σ -complete boolean algebras.	970-978
BOSWELL, M. T. AND BRUNK, H. D. Distribution of likelihood ratio in testing against trend.	371-380
BRONS, H. K., BRUNK, H. D., FRANCK, W. E. AND HANSON, D. L. Generalized means and associated families of distributions. . . .	339-355
BROWN, BRUCE M. Moments of a stopping rule related to the central limit theorem.	1236-1249
BRUCKNER, L. Interpolation of homogeneous random fields on discrete groups.	251-258
BRUNK, H. D. AND BOSWELL, M. T. Distribution of likelihood ratio in testing against trend.	371-380
BRUNK, H. D., FRANCK, W. E., HANSON, D. L. AND BRONS, H. K. Generalized means and associated families of distributions. . . .	339-355
BUTLER, CALVIN C. A test for symmetry using the sample distribution function.	2209-2210
CHATTERJI, S. D. An L^p -convergence theorem.	1068-1070
CHENG, M. C. The orthant probabilities of four Gaussian variates. .	152-161
CHOW, T. R. Equivalence of Gaussian stationary processes.	197-202
CHOW, Y. S. Martingale extensions of a theorem of Marcinkiewicz and Zygmund.	427-433
CHOW, Y. S. AND STOUT, WILLIAM F. On the expected value of a stopped stochastic sequence.	456-461
CHOW, Y. S. AND STUDDEN, W. J. Monotonicity of the variance under truncation and variations of Jensen's inequality.	1106-1108
CONSUL, P. C. On the exact distributions of Votaw's criteria for testing compound symmetry of a covariance matrix.	836-843
COVER, THOMAS, W. Hypothesis testing with finite memory.	828-835
CUPPENS, ROGER. On finite products of Poisson-type characteristic functions of several variables.	434-444
DALEY, D. J. Quasi-stationary behaviour of a left-continuous random walk.	532-539
DAVIS, BURGESS. A comparison test for martingale inequalities. . .	505-508
DAVIS, BURGESS. Divergence properties of some martingale transforms.	1852-1854
DAVIS, JAMES AVERY. A characterization of the upper and lower classes in terms of convergence rates.	1120-1123

DEGROOT, M. H. AND STARR, N. Optimal two-stage stratified sampling.	575-582
DEMPSTER, A. P. Upper and lower probability inferences for families of hypotheses with monotone density ratios.	953-969
DENNY, J. L. Note on a theorem of Dynkin on the dimension of sufficient statistics.	1474-1476
DHARMADHIKARI, S. W. A note on exchangeable processes with states of finite rank.	2207-2208
DHARMADHIKARI, S. W. AND JOGDEO, KUMAR. Bounds on moments of sums of random variables.	1506-1509
DICKEY, JAMES M. Smoothing by cheating.	1477-1482
DOKSUM, KJELL. Minimax results for IFRA scale alternatives.	1778-1783
DOKSUM, KJELL. Starshaped transformations and the power of rank tests.	1167-1176
DOKSUM, K. AND BICKEL, PETER. Test for monotone failure rate based on normalized spacing.	1216-1235
DOLÉANS, CATHERINE. Variation quadratique des martingales continues à droite.	284-289
DOSS, D. C. Characterizations of the linear exponential family in a parameter by recurrence relations for functions of cumulants. .	1721-1727
DUBMAN, M. AND SHERMAN, B. Estimation of parameters in a transient Markov chain arising in a reliability growth model. .	1542-1556
DUDEWICZ, EDWARD J. An approximation to the sample size in selection problems.	492-497
DUDLEY, R. M. The speed of Glivenko-Cantelli convergence.	40-50
DUPAČ, VÁCLAV AND HÁJEK, JAROSLAV. Asymptotic normality of simple linear rank statistics under alternatives II.	1992-2017
EAVES, D. M. The central limit theorem for generalized random fields.	203-215
EISENBERG, BENNETT. The relation of the equivalence conditions for the Brownian motion to the equivalence conditions for certain stationary processes.	2143-2148
ELASHOFF, R. M. AND AFIFI, A. A. Multivariate two sample tests with dichotomous and continuous variables I. The location model.	290-298
FABIAN, VÁCLAV. Stochastic approximation for smooth functions. .	299-302
FARRELL, R. H. On the admissibility of a randomized symmetrical design for the problem of a one way classification.	356-365
FARRELL, R. H. On the Bayes character of a standard model II analysis of variance test.	1094-1097
FISHBURN, PETER C. A general theory of subjective probabilities and expected utilities.	1419-1429
FISHBURN, PETER C. Weak qualitative probability on finite sets. .	2118-2126
FISHER, LLOYD. Limiting sets and convex hulls of samples from product measures.	1824-1832

FISHER, LLOYD AND VAN NESS, JOHN W. Distinguishability of probability measures.....	381-392
FISHER, LLOYD AND WALKUP, D. W. An example of the difference between the Lévy and Lévy-Prokhorov matrices.....	322-324
FOX, MARTIN AND PERNG, S. K. Inadmissibility of the best invariant test when the moment is infinite under one of the hypotheses.....	1483-1485
FOX, MARTIN AND RUBIN, HERMAN. Functions of processes with Markovian slates II.....	865-869
FRANCK, W. E., BRONS, H. K., BRUNK, H. D. AND HANSON, D. L. Generalized means and associated families of distributions....	339-355
FREEDMAN, DAVID A. AND PURVES, ROGER A. Bayes' method for bookies.....	1177-1186
FRISTEDT, BERT. A short proof of a known limit theorem for sum of independent random variables.....	1114-1115
FUJIKOSHI, YASUNORI AND SUGIURA, NARIAKI. Asymptotic expansions of the non-null distributions of the likelihood ratio criteria for multivariate linear hypothesis and independence....	942-952
GABRIEL, K. R. Simultaneous test procedures—some theory of multiple comparisons.....	224-250
GARDNER, L. A., JR. On detecting changes in the mean of normal variates.....	116-126
GASTWIRTH, JOSEPH L. AND RUBIN, HERMAN. On robust linear estimators.....	24-39
GHOSH, J. K. AND BASU, D. Invariant sets for translation-parameter families of measures.....	162-174
GHURYE, S. G. AND OLKIN, INGRAM. Unbiased estimation of some multivariate probability densities.....	1261-1271
GILLILAND, DENNIS. Approximation to Bayes risk in sequences of non-finite games.....	467-474
GILLILAND, DENNIS C. AND HANNAN, JAMES F. On an extended compound decision problem.....	1536-1541
GLESER, LEON JAY. On limiting distributions for sums of a random number of independent random vectors.....	935-941
GODAMBE, V. P. Admissibility and Bayes estimation in sampling finite populations V.....	672-676
GRAYBILL, F. A. AND MILLIKEN, GEORGE. Quadratic forms and idempotent matrices with random elements.....	1430-1438
GRIFFITHS, R. C. The canonical correlation coefficients of bivariate gamma distributions.....	1401-1408
GUPTA, SOMESH DAS. Properties of power functions of some tests concerning dispersion matrices of multivariate normal distributions.....	697-701
GUPTA, SHANTI S. AND BARLOW, RICHARD E. Selection procedures for restricted families of probability distributions.....	905-917

GUPTA, S. S., BARLOW, R. E. AND PANCHAPAKESAN, S. On the distribution of the maximum and minimum of ratios of order statistics.	918-934
GURLAND, JOHN AND MEHTA, J. S. Some properties and an application of a statistic arising in testing correlation.	1736-1745
HÁJEK, JAROSLAV AND DUPAČ, VÁCLAV. Asymptotic normality of simple linear rank statistics under alternatives II.	1992-2017
HALLER, SMITH H. AND BELL, C. B. Bivariate symmetry tests; parametric and nonparametric.	259-269
HAN, CHIEN-PAI. Distribution of discriminant function when covariance matrices are proportional.	979-985
HANNAN, JAMES F. AND GILLILAND, DENNIS C. On an extended compound decision problem.	1536-1541
HANSON, D. L., BRONS, H. K., BRUNK, H. D. AND FRANCK, W. E. Generalized means and associated families of distributions. ...	339-355
HARVILLE, DAVID A. Expression of variance-component estimators as linear combinations of independent noncentral chi-square variates.	2189-2194
HARVILLE, DAVID A. Variances of variance-component estimators for the unbalanced 2-way cross classification with application to balanced incomplete block designs.	408-416
HENRICHON, E. G. AND MOORE, D. S. Uniform consistency of some estimates of a density function.	1499-1502
HERTZ, HELEN S. On convergence rates in the central limit theorem. .	475-479
HEYDE, C. C. On a fluctuation theorem for processes with independent increments II.	688-691
HEYDE, C. C. On extended rate of convergence results for the invariance principle.	2178-2179
HILDEBRAND, DAVID K. Domains of optimality of tests in simple random sampling.	308-312
HILDRETH, CLIFFORD. Asymptotic distribution of maximum likelihood estimators in a linear model with autoregressive disturbances.	583-594
HOEM, JAN M. The sampling distribution of an estimator arising in connection with the truncated exponential distribution. ...	702-703
HOLEWIJN, P. J. Note on Weyl's criterion and the uniform distribution of independent random variables.	1124-1125
HOU, TIEN-FANG. Weak approachability in a two-person game. ...	789-813
HUFF, BARTHEL W. The loose subordination of differential processes to Brownian motion.	1603-1609
ISAACSON, DEAN. Note on the three series theorem.	1844
ISAACSON, DEAN. Stochastic integrals and derivatives.	1610-1616
JACOBSON, HAROLD I. The maximum variance of restricted unimodal distributions.	1746-1752
JAMISON, BENTON AND OREY, STEVEN. An optimal stopping theorem. .	677-678

JENNICH, ROBERT I. Asymptotic properties of non-linear least squares estimators.	633-643
JOGDEO, KUMAR AND DHARMADHIKARI, S. W. Bounds on moments of sums of random variables.	1506-1509
JOHNSON, RICHARD A. AND ROUSSAS, GEORGE C. Asymptotically most powerful tests in Markov processes.	1207-1215
JONES, RICHARD H. Phase free estimation of coherence.	540-548
JOSHI, V. M. Admissibility of the usual confidence sets for the mean of a univariate or bivariate normal population.	1042-1067
JOSHI, V. M. On a theorem of Karlin regarding admissible estimates for exponential populations.	216-223
JOURIS, G. M., PILLAI, K. C. S. AND AL-ANI, S. On the distributions of the ratios of the roots of a covariance matrix and Wilks' criterion for tests of three hypotheses.	2033-2040
JUREČKOVÁ, JANA. Asymptotic linearity of a rank statistic in regression parameter.	1889-1900
KANTER, MAREK. On distinguishing translates of measures.	1773-1777
KEILSON, J. On the matrix renewal function for Markov renewal processes.	1901-1907
KEMPERMAN, J. H. B. On the optimum rate of transmitting information.	2156-2177
KHAN, RASUL A. A general method of determining fixed-width confidence intervals.	704-709
KIMBLETON, STEPHEN R. A stable limit theorem for Markov chains.	1467-1473
KLEINDORFER, GEORGE B., KLEINDORFER, PAUL R., WOODROOFE, MICHAEL B. AND ANDERSON, WILLIAM N., JR. Consistent estimates of the parameters of a linear system.	2064-2075
KLEINDORFER, PAUL R., ANDERSON, WILLIAM N., JR., WOODROOFE, MICHAEL B. AND KLEINDORFER, GEORGE B. Consistent estimates of the parameters of a linear system.	2064-2075
KLIMKO, E. M. A uniform operator ergodic theorem.	1126-1129
KLOTZ, JEROME AND PUTTER, JOSEPH. Maximum likelihood estimation of multivariate covariance components for the balanced one-way layout.	1100-1105
KOUL, HIRA LAL. Asymptotic behavior of Wilcoxon type confidence regions in multiple linear regression.	1950-1979
KOUNIAS, EUSTRATIOS G. AND WENG, TENG-SHAN. An inequality and almost sure convergence.	1091-1093
KRENGEL, U. AND SUCHESTON, L. Note on shift-invariant sets.	694-696
KULLBACK, S. A bound for the variation of Gaussian densities.	2180-2182
KURTZ, THOMAS G. A note on sequences of continuous parameter Markov chains.	1078-1082
KURZ, LUDWICK AND WOINSKY, MELVIN N. Sequential non-parametric two-way classification with prescribed maximum asymptotic error probability.	445-455

KUSHNER, HAROLD J. An application for the Sobelev imbedding theorems to criteria for the continuity of processes with a vector parameter	517-526
LEHMANN, E. L. AND BICKEL, P. J. Unbiased estimation in convex families	1523-1535
LENTNER, M. M. Generalized least-squares estimation of a subvector of parameters in randomized fractional factorial experiments	1344-1352
LOHRDING, R. K. A test of equality of two normal population means assuming homogenous coefficients of variation	1374-1385
LOYNES, R. M. The consistency of certain sequential estimators	568-574
Mc CABE, B. J. The asymptotic behavior of a certain Markov chain	665-666
MAITRA, ASHOK. A note on positive dynamic programming	316-318
MALLOWS, C. L. AND RICHTER, DONALD. Inequalities of Chebyshev type involving conditional expectations	1922-1932
MANN, HENRY B. A note on balanced incomplete block designs	679-680
MANN, NANCY B. Optimum estimators for linear functions of location and scale parameters	2149-2155
MARGOLIN, BARRY H. AND MOSTELLER, FREDERICK. The expected coverage to the left of the i th order statistic for arbitrary distributions	644-647
MARTIN, N. F. G. Uniform convergence of families of martingales	1071-1073
MATHAI, A. M. AND SAXENA, R. K. Distribution of a product and the structural setup of densities	1439-1448
MEHRA, K. L. AND SEN, P. K. On a class of conditionally distribution-free tests for interactions in factorial experiments	658-664
MEHTA, J. S. AND GURLAND, JOHN. Some properties and an application of a statistic arising in testing correlation	1736-1745
MEILIJSO, ISAAC. A note on sequential multiple decision procedures	653-657
MEJZLER, D. AND WEISSMAN, I. On some results of N. V. Smirnov concerning limit distributions for variational series	480-491
METIVIER, MICHEL. Existence of an invariant measure and an Ornstein's ergodic theorem	79-96
MEYER, RICHARD M. Note on a 'multivariate' form of Bonferroni's inequalities	692-693
MILLAR, P. WARWICK. Martingales with independent increments	1033-1041
MILLER, BRUCE L. AND VEINOTT, ARTHUR F., JR. Discrete dynamic programming with a small interest rate	366-370
MILLIKEN, GEORGE AND GRAYBILL, F. A. Quadratic forms and idempotent matrices with random elements	1430-1438
MITRA, S. K. AND RAO, C. R. Conditions for optimality and validity of simple least squares theory	1617-1624
MOORE, D. S. Asymptotically nearly efficient estimators of multivariate location parameters	1809-1823

MOORE, D. S. AND HENRICHON, E. G. Uniform consistency of some estimates of a density function:	1499-1502
MOSTELLER, FREDERICK AND MARGOLIN BARRY H. The expected coverage to the left of the i th order statistic for arbitrary distributions.	644-647
NÁDAS, ARTHUR. An extension of a theorem of Chow and Robbins on sequential confidence intervals for the mean.	667-671
NAGAO, HISAO AND SUGIURA, NARIAKI. On Bartlett's test and Lehmann's test for homogeneity of variances.	2018-2032
NAIR, C. RAMANKUTTY. Partially balanced incomplete block designs with two-way classification of treatments.	175-187
OLKIN, INGRAM AND PRESS, S. J. Testing and estimation for a circular stationary model.	1261-1271
OLSHEN, R. A. AND SIEGMUND, D. O. Some first passage problems for $S_n/n^{1/2}$	648-652
OREY, STEVEN AND JAMISON, BENTON. An optimal stopping theorem.	677-678
PANCHAPAKESAN S., BARLOW, R. E. AND GUPTA, S. S. On the distribution of the maximum and minimum of ratios of order statistics.	918-934
PAULSON, EDWARD. Sequential interval estimation for the means of normal populations.	509-516
PERLMAN, MICHAEL D. One sided problems in multivariate analysis.	549-567
PERNG, S. K. A comparison of the asymptotic expected sample sizes of two sequential procedures for ranking problem.	2198-2202
PERNG, S. K. AND FOX, MARTIN. Inadmissibility of the best invariant test when the moment is infinite under one of the hypotheses.	1483-1485
PETRIE, T. Probabilistic functions of finite state markov chains.	97-115
PFANZAGL, J. Consistent estimation of a location parameter in the presence of an incidental scale parameter.	1353-1357
PFANZAGL, J. Further remarks on topology and convergence in some ordered families of distribution.	51-65
PHILIPP, WALTER. The law of the iterated logarithm for mixing stochastic processes.	1985-1991
PHILIPP, WALTER. The remainder in the central limit theorem for mixing stochastic processes.	601-609
PICKANDS, JAMES, III. Efficient estimation of a probability density function.	854-864
PIERRE, PERCY A. New conditions for central limit theorems.	319-321
PILLAI, K. C. S., AL-ANI, S. AND JOURIS, G. M. On the distributions of the ratios of the roots of a covariance matrix and Wilks' criterion for tests of three hypotheses.	2033-2040
PORT, S. C. AND STONE, C. J. The asymmetric Cauchy processes on the line.	137-143

POSNER, EDWARD C., RODEMICH, EUGENE R. AND RUMSEY, HOWARD, JR. Epsilon entropy of Gaussian processes.	1272-1296
POSNER, EDWARD C., RODEMICH, EUGENE R. AND RUMSEY, HOWARD, JR. Product entropy of Gaussian distributions.	870-904
PREECE, D. A. Near-cyclic representations for some resolution VI fractional factorial plans.	1840-1843
PRESS, JAMES S. On serial correlation.	188-196
PROSCHAN, F. AND BARLOW, R. E. A note on tests for monotone failure rate based on incomplete data.	144-151
PURI, MADAN L. AND PURI, PREM S. Multiple decision procedures based on ranks for certain problems in analysis of variances. ...	619-632
PURI, MADAN LAL AND SEN, PRANAB KUMAR. A class of rank order for a general linear hypothesis.	1325-1343
PURI, MADAN L. AND SEN, PRANAB KUNAR. Analysis of covariance based on general rank scores.	610-618
PURI, MADAN L. AND SHANE, HAROLD D. Rank order tests for multivariate paired comparisons.	2101-2117
PURI, PREM S. AND PURI MADAN, L. Multiple decision procedures based on ranks for certain problems in analysis of variances. ...	619-632
PURVES, ROGER A. AND FREEDMAN, DAVID A. Bayes' method for bookies.	1177-1186
PUTTER, JOSEPH AND KLOTZ, JEROME. Maximum likelihood estimation of multivariate covariance components for the balanced one-way layout.	1100-1105
PYKE, RONALD AND SHORACK, GALEN R. A note on Chernoff-Savage theorems.	1116-1119
RACKTOE, B. L. Combining elements from distinct finite fields in mixed factorials.	498-504
RAO, C. RADHAKRISHNA. A decomposition theorem for vector variables with a linear structure.	1845-1849
RAO, C. R. AND MITRA, S. K. Conditions for optimality and validity of simple least squares theory.	1617-1624
RAO, P. V. AND THORNBLY, J. I. A robust point estimator in a generalized regression model.	1784-1790
RICHTER, DONALD AND MALLOWS, C. L. Inequalities of Chebyshev type involving conditional expectations.	1922-1932
RODEMICH, EUGENE R., RUMSEY, HOWARD, JR. AND POSNER, EDWARD C. Epsilon entropy of Gaussian processes.	1272-1296
RODEMICH, EUGENE R., RUMSEY, HOWARD, JR. AND POSNER, EDWARD C. Product entropy of Gaussian distributions.	870-904
ROOT, D. H. The existence of certain stopping times on Brownian motion.	715-718
ROSENBLATT, JUDAH AND BLUM, J. R. On fixed precision estimation in time series.	1021-1032

ROUSSAS, GEORGE Nonparametric estimation of the transition distribution function of a Markov process.....	1386-1400
ROUSSAS, GEORGE G. AND JOHNSON, RICHARD A. Asymptotically most powerful tests in Markov processes.....	1207-1215
RUBIN, HERMAN AND FOX, MARTIN. Functions of processes with Markovian plates II.....	865-869
RUBIN, HERMAN AND GASTWIRTH, JOSEPH L. On robust linear estimators.....	24-39
RUMSEY, HOWARD, JR., POSNER, EDWARD C. AND RODEMICH, EUGENE R. Epsilon entropy of Gaussian processes.....	1272-1296
RUMSEY, HOWARD, JR., POSNER, EDWARD C. AND RODEMICH, EUGENE R. Product entropy of Gaussian distributions.....	870-904
SAMUELS, S. M. The Markov inequality for sums of independent random variables.....	1980-1984
SATHE, Y. S. AND VARDE, S. D. On minimum variance unbiased estimation of reliability.....	710-714
SAVAGE, I. R. AND SHIMI, I. N. A branching process without re-branching.....	1850-1851
SAXENA, R. A. AND MATHAI, A. M. Distribution of a product and the structural setup of densities.....	1439-1448
SCHAAFSMA, WILLEM. Minimax risk and unbiasedness for multiple decision problems of type I.....	1684-1720
SCHACH, SIEGFRIED. On a class of nonparametric two-sample tests for circular distributions.....	1791-1800
SCHULZER, M. Contributions to the κ -sample problem: a symmetric statistic.....	1933-1949
SCHUSTER, EUGENE, F. Estimation of a probability density function and its derivatives.....	1187-1195
SCHWARTZ, RICHARD E. Invariant proper Bayes tests for exponential families.....	270-283
SCHWARZ, GIDEON. A second-order approximation to optimal sampling regions.....	313-315
SEN, PRANAB KUMAR. On a class of rank order tests for the parallelism of several regression lines.....	1668-1683
SEN, P. K. AND MEHRA, K. L. On a class of conditionally distribution-free tests for interactions in factorial experiments.....	658-664
SEN, PRANAB KUMAR AND PURI, MADAN L. Analysis of covariance based on general rank scores.....	610-618
SEN, PRANAB KUMAR AND PURI, MADAN LAL. A class of rank order for a general linear hypothesis.....	1325-1343
SHANE, HAROLD D. AND PURI, MADAN L. Rank order tests for multivariate paired comparisons.....	2101-2117
SHARPE, MICHAEL. Sample variations of homogeneous processes...	399-407
SHARPE, MICHAEL J. Zeroes of infinitely divisible densities.....	1503-1505

SHEPP, L. A. Explicit solutions to some problems of optimal stopping	993-1010
SHERMAN, B. AND DUBMAN, M. Estimation of parameters in a transient Markov chain arising in a reliability growth model.	1542-1556
SHIMI, I. N. AND SAVAGE, I. R. A branching process without re-branching.	1850-1851
SHORACK, GALEN R. Asymptotic normality of linear combinations of functions of order statistics.	2041-2050
SHORACK, GALEN R. AND PYKE, RONALD. A note on Chernoff-Savage theorems.	1116-1119
SHUBERT, BRUNO O. Bayesian model of decision-making as a result of learning from experience.	2127-2142
SIEGMUND, DAVID. On moments of the maximum of normed partial sums.	527-531
SIEGMUND, DAVID. The variance of one-sided stopping rules.	1074-1077
SIEGMUND, D. O. AND OLSHEN, R. A. Some first passage problems for $S_n/n^{\frac{1}{2}}$	648-652
SIEVERS, GERALD L. On the probability of large deviations and exact slopes.	1908-1921
SKIBINSKY, MORRIS. Some striking properties of binomial and Beta moments.	1753-1764
STARR, N. AND DEGROOT, M. H. Optimal two-stage stratified sampling.	575-582
STECK, G. P. The Smirnov two sample tests as rank tests.	1449-1466
STEIGER, W. L. A best possible Kolmogoroff-type inequality for martingales and a characteristic property.	764-769
STEPHENS, M. A. Results from the relation between two statistics of the Kolmogorov-Smirnov type.	1833-1837
STEUTEL, F. W. Infinitely divisible renewal distributions.	1109-1113
STEUTEL, F. W. Note on completely monotone densities.	1130-1131
STIGLER, STEPHEN MACK. Linear functions of order statistics.	770-788
STONE, CHARLES J. The growth of a random walk.	2203-2206
STONE, C. J. AND PORT, S. C. The asymmetric Cauchy processes on the line.	137-143
STONE, LAWRENCE D. On the distribution of the supremum functional for semi-Markov processes with continuous state spaces.	844-853
STOUT, WILLIAM F. AND CHOW, Y. S. On the expected value of a stopped stochastic sequence.	456-461
STRATTON, H. H. AND BINMORE, K. G. A note on characteristic functions.	303-307
STUDDEN, W. J. AND CHOW, Y. S. Monotonicity of the variance under truncation and variations of Jensen's inequality.	1106-1108
STUDDEN, WILLIAM J. AND VAN ARMAN, D. J. Admissible designs for polynomial spline regression.	1557-1569
SUCHESTON, L. AND KRENGEL, U. Note on shift-invariant sets.	694-696

SUDDERTH, WILLIAM D. A note on thrifty strategies and martingales in a finitely additive setting.	2211-2214
SUDDERTH, WILLIAM D. On measurable, nonleavable gambling houses with a goal.	66-70
SUGIURA, NARIAKI. Asymptotic expansions of the distributions of the likelihood ratio criteria for covariance matrix.	2051-2063
SUGIURA, NARIAKI AND FUJIKOSHI, YASUNORI. Asymptotic expansions of the non-null distributions of the likelihood ratio criteria for multivariate linear hypothesis and independence.	942-952
SUGIURA, NARIAKI AND NAGAO, HISAO. On Bartlett's test and Lehmann's test for homogeneity of variances.	2018-2032
TAKÁCS, LAJOS. On Erlang's formula.	71-78
TAKEUCHI, KEI. A note on the test for the location parameter of an exponential distribution.	1838-1839
TAMURA, RYOJI. Some multivariate comparison procedures based on ranks.	1486-1491
THORNBY, J. I. AND RAO, P. V. A robust point estimator in generalized regression model.	1784-1790
TONG, YUNG LIANG. On partitioning a set of normal populations by their locations with respect to a control.	1300-1324
TRACY, DERRICK S. Some multiple products of polykays.	1297-1299
VAN ARMAN, D. J. AND STUDDEN, WILLIAM J. Admissible designs for polynomial spline regression.	1557-1569
VAN NESS, JOHN W. AND FISHER, LLOYD. Distinguishability of probability measures.	381-392
VAN RYZIN, J. On strong consistency of density estimates.	1765-1772
VARDE, S. D. AND SATHE, Y. S. On minimum variance unbiased estimation of reliability.	710-714
VEINOTT, ARTHUR F., JR. Discrete dynamic programming with sensitive discount optimality criteria.	1635-1660
VEINOTT, ARTHUR F., JR. AND MILLER, BRUCE L. Discrete dynamic programming with a small interest rate.	366-370
VILLEGAS, C. On the <i>a priori</i> distribution of the covariance matrix.	1098-1099
VILLEGAS, C. On the least squares estimation of non-linear relations.	462-466
WAGNER, TERRY J. On the rate of convergence for the law of large numbers.	2195-2197
WALKUP, D. W. AND FISHER, LLOYD. An example of the difference between the Lévy and Lévy-Prokhorov matrices.	322-324
WATSON, GEOFFREY S. Density estimation by orthogonal series.	1496-1498
WEGMAN, EDWARD J. A note on estimating a unimodal density.	1661-1667
WEISSMAN, I. AND MEJZLER, D. On some results of N. V. Smirnov concerning limit distributions for variational series.	480-491
WENG, TENG-SHAN AND KOUNIAS, EUSTRATIOS G. An inequality and almost sure convergence.	1091-1093

WICHURA, MICHAEL J. Inequalities with applications to the weak convergence of random processes with multi-dimensional time parameters.	681-687
WILLIAMS, E. J. Cauchy-distributed functions and a characterization of the Cauchy distribution.	1083-1085
WOINSKY, MELVIN N. AND KURZ, LUDWICK. Sequential non-parametric two-way classification with prescribed maximum asymptotic error probability.	445-455
WONG, EUGENE. Homogeneous Gauss-Markov random fields.	1625-1634
WOODROOFE, MICHAEL B., ANDERSON, WILLIAM N., JR., KLEINDORFER, GEORGE B. AND KLEINDORFER, PAUL R. Consistent estimates of the parameters of a linear system.	2064-2075
WYNER, A. D. On the asymptotic distribution of a certain functional of the Wiener process.	1409-1418
YAHAV, JOSEPH A. AND BICKEL, PETER J. On an A.P.O. rule in sequential estimation with quadratic loss.	417-426
YAKOWITZ, S. A consistent estimator for the identification of finite mixtures.	1728-1735
ZIDEK, J. V. Inadmissibility of the best invariant estimator of extreme quantiles of the normal under squared error loss.	1801-1808

CORRECTION NOTES

ABE, O. Correction to "A central limit theorem for the number of edges in the random intersection of two graphs".	1510
BANERJEE, K. S. Correction to "Singularity in Hotelling's weighing designs and a generalized inverse".	719
GREENBERG, B. G. AND SARHAN, A. E. Correction to "Estimation of location and scale parameters by order statistics from singly and doubly censored samples. Part I. The normal distribution up to samples of size 10".	325
IOSIFESCU, MARIUS. Correction to "Sampling entropy for random homogenous systems with complete corrections".	2215
PIERRE, PERCY A. Correction to "New conditions for central limit theorem".	1855
SARHAN, A. E. AND GREENBERG, B. G. Correction to "Estimation of location and scale parameters by order statistics from singly and doubly censored samples. Part I. The normal distribution up to samples of size 10".	325
SRIVASTAVA, SURENDRA K. Correction to abstract "A generalized estimator for the mean of a finite population using multi-auxiliary information".	1510

BOOK REVIEWS

CUPPENS, R. Review of "Advanced Theory of Characteristic Functions" by B. Ramachandran.	1139-1141
--	-----------

DALENIUS, TORE. Review of "Sampling Theory and Methods" by M. N. Murphy.....	1136-1138
DUDLEY, R. M. Review of "Probability Measures on Metric Spaces" by K. R. Parthasarathy.....	328
FABIAN, VÁCLAV. Review of "Stochastic Approximation and Nonlinear Regression" by Arthur E. Albert and Leland A. Gardner, Jr.....	1134-1135
JOHNSON, NORMAN L. Review of "Handbook of the Poisson Dis- tribution" by Frank A. Haight.....	326-327
KALLIANPUR, G. Review of "Probability" by Leo Breiman.....	1132-1133

MISCELLANEOUS

Addendum.....	1855
Book Reviews.....	326-328, 1132-1141
Correction Notes.....	325, 719, 1510, 1855, 2215
Abstracts of papers. 329-332, 720-727, 1142-1161, 1511-1518, 1856-1883, 2216-2226	
Auditor's Report.....	2230-2232
News and Notices 333-337, 728-740, 1162-1164, 1519-1520, 1884-1887, 2227-2236	
Report of the President for 1969.....	2229
Report of the Treasurer for 1969.....	2229
Report of the Program Secretary for 1969.....	2233
Report of the Editor for 1969.....	2233
Report of the Managing Editor for 1969.....	2233
Report of the New York meeting.....	2234-2235
Minutes of the 1969 Business meeting.....	2235
Publications Received.....	337, 741, 1166, 1520-1521, 1887, 2237

INDEX OF ABSTRACTS FOR 1969

- AFONJA, B. AND TIAO, G. C., 1514-1515
AHMAD, R., 1142
AHSANULLAH, M., 1862
AHSANULLAH, M. AND SALEH, A. K. E., 2220
AHUJA, J. C., 1513-1514
AOKI, M., 1865
ARVESEN, J. N., 720, 1869
ARUNKUMAR, S. AND BARLOW, R. E., 1151
BANERJEE, P. K. AND SRIVASTAVA, M. S., 2217
BARLOW, R. E. AND ARUNKUMAR, S., 1151
BARRON, A. AND GUPTA, S. S., 1870
BARTHOLOMEW, D. J., 1864
BARTLETT, MAURICE S., 1864
BASU, A. K., 1862
BELKIN, B., 1873
BELL, C. B., 1151
BELL, C. B., AND GUIRE, K., 1144
BELL, C. B. AND SMITH, P., 1149
BEYER, J. N., MOORE, A. H. AND HARTER, H. L., 330
BHAPKAR, V. P., 1158
BHARGAVA, R. P. AND SRIVASTAVA, M. S., 1857, 2224, 2225
BHAT, B. R. AND KULKARNI, S. R., 2223
BHAT, V. N. AND SHRIKHANDE, S. S., 2221
BHATTACHARYA, G. K. AND JOHNSON, R. A., 1867
BICKEL, P. J., 2217
BONDAR, J., 1877
BORSTING, J. R. AND LOCKETT, J. L. III, 1515
BOSWELL, M. T. AND PATIL, G. P., 1869
BRATCHER, T. L. AND SCHUCANY, W. R., 720
BRILLINGER, D. R., 2221
CARNEY, E. J., 1857
CHAN, L. K., 723, 1159
CLÉROUX, R., 2220
COHEN, A. AND SACROWITZ, H. B., 1859
CONOVER, W. J., 1151
COVER, T. W. AND HELLMAN, M. E., 1867
DAVIS, H. I., 1152
DEGROOT, M. H. AND RAGHAVACHARI, M., 1866
DESHPANDÉ, J. V. AND GOVENDARAJULA, Z., 1152
DESU, M. M. AND ENIS, P., 1873
DEVERMAN, J. N. AND GUPTA, S. S., 1870
DICK, R., 1861
DICKEY, J. M., 1864
DUDEWICZ, E. J., 1156
DVORETZKY, A., 1871
EATON, M. L. AND MORRIS, C., 2226
EHRENFELD, S., 1881
ENIS, P. AND DESU, M. M., 1873
ENIS, P. AND GEISSER, S., 1142
FEDER, P. I. AND MEZAKI, R., 1879
FELDMAN, D., 1869
FERGUSON, T. S., 1878
FILLIBEN, J. J., 1872
FOX, M., 1143
FRASER, D. A. S. AND KLASS, W., 1877
FRASER, D. A. S. AND PRENTICE, R. L., 1876
FRASER, D. A. S. AND STREIT, F., 1871
GARZA-HERNANDEZ, T., 1513
GASTWIRTH, J. L., 1143, 1157, 1159
GASTWIRTH, J. L. AND RUBIN, H., 1517
GEISSER, S. AND ENIS, P., 1142
GEISSER, S. AND KAPPENMAN, R. F., 1145
GHOSH, M., 329

- GHOSH, M. AND SEN, P. K., 1857
GHOSH, P., 1159
GIRI, N. C., 331, 1856
GISSELQUIST, R., 2225
GODAMBE, A. V. AND PATIL, G. P., 1975
GODAMBE, V. P., 2218, 2219
GOOD, I. J., 1860, 1863
GOVINDARAJULA, Z., 1143
GOVINDARAJULA, A. AND DESHPANDÉ, J. V., 1152
GOVINDARAJULA, Z. AND LESLIE, R. T., 2217
GUIRE, K. AND BELL, S. B., 1144
GULATI, B. R., 723, 1514
GULATI, B. R., JOHNSON, B. McK. AND KOEHN, U., 2217
GULATI, B. R. AND KOUNIAS, E. G., 720, 1880, 2218
GUPTA, A. K., 721, 1152
GUPTA, R. C. AND LAURENT, A. G., 1865
GUPTA, S. S. AND BARRON, A., 1870
GUPTA, S. S. AND DEVERMAN, J. N., 1870
GURLAND, J. AND MILTON, R., 1867
HAAN, L. D., 1880
HADER, R. J., MANSON, A. R. AND PARISH, R. G., 330
HALL, W. J., 1879
HAQ, M. S., 1144
HARKNESS, W. L., 1873
HARRIS, B. AND PARK, C. J., 1869
HARTER, H. L., MOORE, A. H. AND BEYER, J. N., 330
HARTER, H. L., MOORE, A. H. AND SHELNUIT, W., 332
HARTIGAN, J. A., 2216
HATCH, L. O. AND POSTEN, H. O., 1875
HELLMAN, M. E. AND COVER, T. M., 1867
HETTMANSPERGER, T. P. AND SIEVERS, G., 1878
HOCKING, R. R. AND SPEED, F. M., 1881, 1881, 1882
HOGBEN, D., 720
HOLLANDER, M., 1857
HOU, T. F., 1152, 1862
HULTQUIST, R., 1160
JANARDAN, K. G. AND PATIL, G. P., 1872
JOGDEO, K., 1144
JOHN, P. W. M., 1144, 1153, 1874
JOHNSON, B. McK., 1876
JOHNSON, B. McK., KOEHN, U. AND GULATI, B. R., 2217
JOHNSON, R. A. AND BHATTACHARYYA, G. K., 1867
JOHNSON, R. A. AND ROUSSAS, G. G., 1867
JOSHI, P. C., 1961
KADANE, J. B., 1153
KAPPENMAN, R. F. AND GEISSER, S., 1145
KELKER, D., 1153
KETTENRING, J. R., 1512
KIMELDORF, G. AND WAHBA, G., 1862
KLASS, W. AND FRASER, D. A. S., 1877
KOEHN, U., GULATI, B. R. AND JOHNSON, B. McK., 2217
KOUL, H. L., 2223
KOUNIAS, E., 2220
KOUNIAS, E. G. AND GULATI, B. R., 720, 1880, 2218
KOVNER, J. L. AND PATIL, S. A., 1868
KRISHNAIAH, P. R. AND SEN, P. K., 1145
KULKARNI, S. R., 724
KULKARNI, S. R. AND BHAT, B. R., 2223
KULLBACK, S., 724, 724
KURKJIAN, B. AND WOODALL, R. C., 1511
KUROTSCHKA, V., 1146
LAYARD, M. W. J., 1858
LAND, C. E., 1860

- LAURENT, A. G. AND GUPTA, R. C., 1865
LEPAGE, R. D., 1866
LESLIE, R. T. AND GOVINDARAJULA, Z., 2217
LEW, R. A., 1145
LEWIS, P. A. W., 725
LOCKETT, J. L. III AND BORSTING, J. R., 1515
LOHRDING, R. K., 723
LORDEN, G., 1878
LUKACS, E., 1859
MAIK, R., 725
MAITRA, A. AND PARTHASSARATHY, T., 1154
MANDREKAR, V. AND SALEHI, H., 2220
MANSON, A. R., PARISH, R. G. AND HADER, R. J., 330
MARGOLIN, B. H., 331
MEHTA, J. S. AND SRINIVASAN, R., 329, 330, 1157
MEZAKI, R. AND FEDER, P. I., 1879
MIKE, V., 1875
MILCH, P. R. AND WAGGONER, M. H., 1856
MILES, R. E., 1160
MILTON, R. AND GURLAND, J., 1867
MOHANTY, S. G. AND PETROS, C. I., 2216
MOORE, A. H., HARTER, H. L. AND BEYER, J. N., 330
MOORE, A. H., HARTER, H. L. AND SHELNUTT, W., 332
MORGAN, R. L., 1146
MORRIS, C. AND EATON, M. L., 2226
MURTY, V. N., 1160, 1858, 1858
NAGAMBAL, P. N. AND TRACY, D. S., 1860
NAGAO, H. AND SUGIURA, N., 722
NAIR, S. S., 1863
NEMENYI, P., 1511
NEUTS, M. F. AND RESNICK, S. I., 1515
OATEN, A., 1872
OBENCHAIN, R. L., 1511
OLSON, W. H. AND UPPULURI, V. R. R., 1512
PADMANABHAN, A. R., 721
PANCHAPAKESAN, S., 1146
PARANJAPE, S. R. AND RUBIN, H., 1147
PARISH, R. G., HADER, R. J. AND MANSON, A. R., 330
PARK, C. J., 1147
PARK, C. J. AND HARRIS, B., 1869
PARTHASSARATHY, T. AND MAITRA, A., 1154
PATIL, G. P. AND BOSWELL, M. T., 1869
PATIL, G. P. AND GODAMBE, A. V., 1875
PATIL, G. P. AND JANARDAN, K. G., 1872
PATIL, S. A. AND KOVNER, J. L., 1868
PAULSON, E., 1865
PERLMAN, M. D., 1864
PETROS, C. I. AND MOHANTY, S. G., 2216
POSTEN, H. O. AND HATCH, L. O., 1875
PHILLIPS, R. D., 1880
PILLAI, K. C. S. AND YOUNG, D. L., 1882
PIERCE, D. A., 1147
PRABHU, N. U. AND RUBINOVITCH, M., 1856
PRENTICE, R. L. AND FRASER, D. A. S., 1876
PURI, M. L. AND SEN, P. K., 721
PURI, P. S., 725
PURI, P. S. AND RUBIN, H., 1517
QUESENBERY, C. P. AND SEHEULT, A. H., 2224
RAGHAVACHARI, M. AND DEGROOT, M. H., 1866
RAMBERG, J. S., 1877, 1882
RANGLES, R. H., 1872
RAO, C. R., 1861, 1871
READ, C. B., 1863

- READ, R. R., 1515
 RESNICK, S. I. AND NEUTS, M. F., 1515
 ROBBINS, H. E., 1881
 ROBILLARD, P., 1158
 ROUSSAS, G. C. AND JOHNSON, R. A., 1867
 RUBIN, H. AND GASTWIRTH, J. L., 1517
 RUBIN, H. AND PARANJAPÉ, S. R., 1147
 RUBIN, H. AND PURI, P. S., 1517
 RUBINOVITCH, M., 1513
 RUBINOVITCH, M. AND PRABHU, N. U., 1856
 RUIZ-MONCAYO, A., 1882
 SACROWITZ, H. B. AND COHEN, A., 1859
 SALEH, A. K., MD. E., 2219
 SALEH, A. K. MD. E. AND AHSAN-ULLAH, M., 2220
 SALEHI, H. AND MANDREKAR, V., 2220
 SAXENA, K. M. L., 726, 1154, 1161
 SCHAAFSMA, W., 1154
 SCHUCANY, W. R. AND BRATCHER, T. L., 720
 SEHEULT, A. H. AND QUESENBERRY, C. P., 2224
 SEN, P. K. AND GHOSH, M., 1857
 SEN, P. K. AND KRISHNAIAH, P. R., 1145
 SEN, P. K. AND PURI, M. L., 721
 SENETA, E., 2226
 SERFLING, R. J., 1513
 SETHURAMAN, J., 1148
 SEVERO, N. C., 1148
 SHAH, K. R., 1876
 SHELNUTT, W., MOORE, A. H. AND HARTE, H. L., 332
 SHRIKHANDE, S. S. AND BHAT, V. N., 2221
 SIEVERS, G. AND HETTMANSPERGER, T. P., 1878
 SIMMONS, G., 1511
 SINGH, J., 722
 SINGH, J., 726, 1517
 SINGH, R., 1866
 SIOTANI, M., 1148
 SKIBINSKY, M., 1861
 SKIVISH, J., 1161
 SMITH, K. J. C., 1865
 SMITH, P. J., 331
 SMITH, P. AND BELL, C. B., 1149
 SOLOMON, D. L., 726
 SORUM, M., 1516
 SOULTS, D. J., 1149
 SPEED, F. M. AND HOCKING, R. R., 1881, 1881, 1882
 SPJØTVOLL, E., 1868
 SPROULE, R. N., 1879
 SRINIVASAN, R. AND MEHTA, J. S., 329, 330, 1157
 SRIVASTAVA, A. B. L. AND SRIVASTAVA, R. C., 1874
 SRIVASTAVA, J. N., 1155
 SRIVASTAVA, M. S., 2216, 2221, 2222, 2222, 2222, 2223, 2224
 SRIVASTAVA, M. S. AND BANERJEE, P. K., 2217
 SRIVASTAVA, M. S. AND BHARGAVA, R. P., 1857, 2224, 2225
 SRIVASTAVA, M. S. AND TANEJA, V. S., 1879, 2223
 SRIVASTAVA, R. C. AND SRIVASTAVA, A. B. L., 1874
 SRIVASTAVA, S. K., 1161
 STECK, G. P., 1155
 STOUT, W. F., 1515
 STREIT, F., 2225
 STREIT, F. AND FRASER, D. A. S., 1871
 STYAN, G. P. H., 1142, 1149, 1868
 SUGIURA, N. AND NAGAO, H., 722
 SURYANARAYANA, K. V., 1149, 1870
 TANEJA, V. S. AND SRIVASTAVA, M. S., 1879, 2223
 TIAO, G. C. AND AFONJA, B., 1514
 TOMKINS, R. J., 1874
 TONG, Y. L., 1150

- TORGENSEN, E. N., 727, 1155, 1516, 2219
TRACY, D. S. AND NAGAMBAL, P. N., 1860
TSAO, C. K., 722
UPPULURI, V. R. R. AND OLSON, W. H., 1512
VAN DER MEULEN, E. C., 1157
VAN RYZIN, J., 1150
WAGGONER, M. H. AND MILCH, P. R., 1856
WAHBA, G. AND KIMELDORF, G., 1862
WARNER, J. E., 1150
WASAN, M. T., 1150, 1860
WEGMAN, E. J., 1517, 1856, 2226
WOODALL, R. C. AND KURKJIAN, B., 1511
YAKOWITZ, S. J., 1156
YARNOLD, J. K., 1158
YEN, E. H., 1876
YOUNG, D. L. AND PILLAI, K. C. S., 1882



